

REMARKS

Claims 1, 3-6, 8-28 and 62-70 are currently before the Examiner. Claim 1 has been amended herein.

Referring to the office action mailed April 28, 2004, claims 1, 3-6, 8-28 and 62-70 stand rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,541,872 to Schrock et al., (referred to herein as Schrock) in view of JP08250835 (referred to herein as JP'835) for substantially the same reasons as set forth in section 7 of Paper No. 120403. The rejection is respectfully traversed.

Initially, Applicants respectfully state that the art for the manufacture of an encapsulated surface mount electronic device differs significantly from the attachment of such a surface mount electronic device to a PCB. Schrock and JP'835 are both directed to the manufacture of a "surface mount electronic device," while the present application is directed to a surface mount electronic device attached to a PCB utilizing a thermoplastic adhesive.

In this preliminary amendment, applicants have amended claim 1 to further clarify that the surface mount device of the present invention is pre-manufactured and encapsulated and it is this device that is attached to the printed circuit board (PCB) via the thermoplastic adhesive.

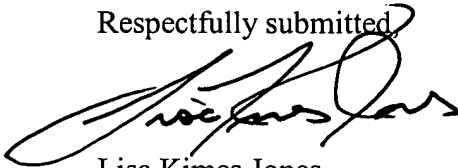
Different considerations need to be taken into account when attempting to improve the reliability of an encapsulated die package as opposed to improving the adhesion of the die package to a PCB. Thermoplastic adhesives are not currently utilized in the art to attach surface mount electronic devices to PCBs. The current technology is an under-fill technology which utilizes a thermoset resin to cover the entire bottom of the surface mount device. However, the use of underfills does not provide adequate adhesion especially with the increase in interconnect density and also introduces a costly and complex manufacturing step. In contrast to thermoset underfill, the thermoplastic

adhesive of the present invention provides adhesion when applied only to a portion of the available surface and without risking damage to solder joints. The thermoplastic adhesive exhibits improved impact and hydrothermo cycling resistance when compared to known thermoset under-fills. The thermoplastic adhesive also reduces the manufacturing time and allows for convenient reworking or repair of faulty chips. Neither Schrock or JP'835 teach or suggest such use for a thermoplastic.

Both Schrock and JP'835 are directed to manufacturing a die package. Schrock is directed to a multi-layer adhesive tape to be utilized in encapsulated packages (See Schrock col 4, lines 34-35). Schrock therefore does not teach the present invention of utilizing a thermoplastic adhesive, as an alternative to current resin underfill technology, to attach encapsulated die packages to a printed circuit board. JP'835 is directed to a film with perforations for the solder bumps utilized in the manufacture of an LSI package. JP'835 does solve the deficiency of Schrock.

In light of the above amendments and remarks, it is respectfully submitted that the pending claims of the present application are in condition for allowance. If the Examiner has any questions or requires additional information, he is invited to contact the undersigned.

Respectfully submitted



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